

ABSTRACT

Disclosed is a method of producing an LnCuOX single-crystal thin film (wherein Ln is at least one selected from the group consisting of lanthanide elements and yttrium, and X is at least one selected from the group consisting of S, Se and Te), which comprises the steps of growing a base thin film on a single-crystal substrate, depositing an amorphous or polycrystalline LnCuOX thin film on the base thin film to form a laminated film, and then annealing the laminated film at a high temperature of 500°C or more. While a conventional LnCuOX film produced by growing an amorphous film through a sputtering process under appropriate conditions and then annealing the film at a high temperature was unexceptionally a polycrystalline substance incapable of achieving high emission efficiency and electron mobility required for a material of light-emitting devices or electronic devices, the method of the present invention can grow a thin film with excellent crystallinity suitable as a single crystal to an building block of light-emitting diodes, semiconductor lasers, field-effect transistors, or a hetero-bipolar transistors.